2

CLAIMS

1. (Currently amended) A high capacity distributed packet switch comprising:(a) a plurality of edge modules, each edge module including at least three input/output dual ports, the at least three input/output dual ports being organized in a group of J dual ports, a group of K dual ports and a group of L dual ports; wherein

(b) the group of J dual ports is connected by communication links to a single regional core center comprising a number of spatially distributed regional core modules;

(c) the group of L dual ports is connected by communications links to a plurality of global core centers; and

(d) the group of K dual ports is connected by communications links to data traffic sources and data traffic sinks.; and

said each edge module is time-locked to at least one of said regional core modules.

2. (Canceled)

3. (Original) The high capacity distributed switch as claimed in claim 1 wherein each of said plurality of global core centers comprises spatially distributed global core modules.

4. (Currently amended) The high capacity distributed switch as claimed in claim 2 1 wherein each of said regional core modules comprises a plurality of parallel memory-less switches.

5. (Original) The high capacity distributed switch as claimed in claim 3 wherein each of said global core modules comprises a plurality of parallel memory-less switches.

6. (Original) The high capacity distributed switch as claimed in claim 4 wherein each of said plurality of parallel memory-less switches is an optical space switch.

2

3

7. (Original) The high capacity distributed switch as claimed in claim 5 wherein each of said plurality of parallel memory-less switches is an optical space switch.

8. (Original) The high capacity distributed switch as claimed in claim 1 wherein the plurality of edge modules are divided into groups, each group defining a region, and said group of J dual-ports of each edge module belonging to a one of the groups is connected exclusively to a respective regional core center.

9. (Original) The high capacity distributed switch as claimed in claim 1 wherein the L dual ports of said group of L dual ports of each edge module in a group of edge modules are connected directly to selected ones of the global core modules.

10. (Original) The high capacity distributed switch as claimed in claim 9 wherein the dual ports of said group of L dual ports of two or more of the edge modules in a group of edge modules are respectively connected to two or more of the global core modules via a memoryless shuffle stage.

11. (Currently amended) The high capacity distributed switch as claimed in claim 9 1 wherein the dual ports of said group of L dual ports of at least two or more of the edge modules in a group of edge modules are respectively connected to at least two or more of the global core modules via a memory-less cross-connector.

12. (Currently amended) The A high capacity distributed packet switch as claimed in claim 2 comprising a plurality of edge modules, each edge module including at least three dual ports, the at least three dual ports being organized into:

a group of J dual ports connected by communication links to a single regional core center;

a group of L dual ports connected by communications links to a plurality of global core centers; and

a group of K dual ports connected by communications links to data traffic sources and data traffic sinks;

wherein

3

4

said regional core center comprises a number of spatially distributed regional
core modules, and

the regional core modules and their associated edge modules are spatially
separated in a geographical zone bounded by a distance at which a
propagation-delay of ~~signals~~ a signal traveling on ~~the links~~ a link between any
core module and any associated edge module is within a predetermined
upper bound.

13. (Canceled)

14. (Currently amended) ~~The~~ A high capacity distributed packet switch ~~as claimed in claim 2~~ comprising a plurality of edge modules, each edge module including at least three dual ports, the at least three dual ports being organized into:

a group of J dual ports connected by communication links to a single regional
core center;

a group of L dual ports connected by communications links to a plurality of
global core centers; and

a group of K dual ports connected by communications links to data traffic
sources and data traffic sinks;

wherein

said regional core center comprises a number of spatially distributed regional
core modules, and

an edge module is collocated and associated with each regional core module,
and a regional core controller is hosted by each of the edge modules
collocated with the respective regional core modules.

15. (Currently amended) ~~The~~ A high capacity distributed packet switch ~~as claimed in claim 3~~ comprising a plurality of edge modules, each edge module including at least three dual ports, the at least three dual ports being organized into:

4

5

a group of J dual ports connected by communication links to a single regional core center;

a group of L dual ports connected by communications links to a plurality of global core centers; and

a group of K dual ports connected by communications links to data traffic sources and data traffic sinks;

wherein

each of said plurality of global core centers comprises spatially distributed global core modules; and

an edge module is collocated and associated with each global core module, and a global core controller is hosted by each of the edge modules collocated with the respective global core modules.

16. (Currently amended) ~~The~~ A high capacity distributed packet switch ~~as claimed in claim 1~~ comprising a plurality of edge modules, each edge module including at least three dual ports, the at least three dual ports being organized into:

a group of J dual ports connected by communication links to a single regional core center;

a group of L dual ports connected by communications links to a plurality of global core centers; and

a group of K dual ports connected by communications links to data traffic sources and data traffic sinks;

wherein

each edge module maintains a route-set to every other edge module in the global distributed switch, the elements of each route-set identifying routes to a respective other edge module.

5

6

17. (original) The high capacity distributed switch as claimed in claim 16 wherein the routes in each route-set are sorted according to a predetermined criterion.

18. (Currently amended) The high capacity distributed switch as claimed in claim 2 1 wherein a regional core module is adaptively reconfigured in response to fluctuations in data traffic loads.

19. (Original) The high capacity distributed switch as claimed in claim 3 wherein a global core module is adaptively reconfigured in response to fluctuations in data traffic loads.

20. (Currently amended) The A high capacity distributed packet switch as claimed in claim 1 comprising a plurality of edge modules, each edge module including at least three dual ports, the at least three dual ports being organized into:

   a group of J dual ports connected by communication links to a single regional core center;

   a group of L dual ports connected by communications links to a plurality of global core centers; and

   a group of K dual ports connected by communications links to data traffic sources and data traffic sinks;

wherein a cyclic time period of a control timing circuit of a regional core module is substantially shorter than a cyclic time period of a control timing circuit of a global core module.

21. (Original) The high capacity distributed switch as claimed in claim 20 wherein the control timing circuit for each of the regional core modules comprises an 18-bit counter, the control timing circuit for each of the global core modules is a 22-bit counter, and the clock rate for all of the regional and global core modules is 16 megahertz.

6

7

22. (Currently amended) The high capacity distributed switch as claimed in claim 4
20 wherein a rate at which a global core module is reconfigured is substantially lower
than a rate at which a regional core module is reconfigured.

23. (Canceled)

24. (Canceled)

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Canceled)

30. (Canceled)

31. (Canceled)

32. (Canceled)

33. (Currently amended) The A high capacity distributed packet switch as claimed in
claim 11 comprising a plurality of edge modules, each edge module including at
least three dual ports, the at least three dual ports being organized into:

    a group of J dual ports connected by communication links to a single regional
    core center;

    a group of L dual ports connected by communications links to a plurality of
    global core centers; and

    a group of K dual ports connected by communications links to data traffic
    sources and data traffic sinks;

wherein .

7

8

the dual ports of said group of L dual ports of at least two of the edge
modules in a group of edge modules are respectively connected to at least
two of the global core modules via a memory-less cross-connector; and

the memoryless cross-connectors are configured based on long term spatial
traffic distribution estimations and projections.

34. (Original) The high capacity distributed switch as claimed in claim 33 wherein
new route-sets are distributed to each edge module controller prior to reconfiguration
of said memory-less cross connectors.